

Interim Report on Bird Inventory and Monitoring at National Park Service Units in the Northern Great Plains, 2003



By:

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Introduction

National Park Service (NPS) lands (including National Parks, Monuments, Historic Sites, and Memorials) often support high-quality biological communities and may have significant natural resource conservation values. In particular, birds are a natural resource for which many parks are highly valued, even if they were not established, and are not managed, with birds in mind. NPS lands have been, and continue to be, subject to a variety of internal and external pressures that can affect the integrity of ecosystems within a park. These pressures may include historical and/or current land use within the park, public visitation and recreation, management emphasis of other resources, and changes in the surrounding landscape.

Although park management plans typically do not address birds directly, birds are a valuable resource that should be managed carefully in national parks for enjoyment by the public. Birding is an increasingly popular activity, as evidenced by the fact that in 2001, 46 million birdwatchers in America spent more than 32 billion on birding and related activities (USFWS 2002). Thus, the maintenance of healthy bird communities in national parks can have positive impacts on the experience of park visitors and on local economies.

Inventory and long-term monitoring of bird populations provides information that is essential for the effective management and conservation of birds in national parks. However, bird monitoring can also serve other purposes. Because bird communities in a given landscape reflect an integration of a broad array of ecosystem conditions, including productivity, vegetation structure and composition, water quality, and landscape integrity (Adamus et al. 2001), birds are increasingly being recognized as indicators of biological integrity and environmental change (Morrison 1986, Croonquist and Brooks 1991, Bureau of Land Management 1998, O'Connell et al. 2000, U.S. EPA 2002, Birdlife International 2003). Thus, monitoring birds also provides a means to monitor the broader effects of human activities on the ecosystem and gauge the sustainability of those activities.

In 2003, Rocky Mountain Bird Observatory (RMBO) implemented the second year of a three-year cooperative effort with the NPS Inventory and Monitoring (I&M) Program in the Northern Great Plains Network (NGNP) to conduct bird inventories and monitoring in seven NPS units ("parks"). The parks, located in Wyoming, South Dakota, and North Dakota, include Devil's Tower National Monument, Jewel Cave National Monument, Wind Cave National Park, Mount Rushmore National Memorial, Fort Laramie National Historic Site, Fort Union Trading Post National Historic Site, and Knife River Indian Villages National Historic Site. This report details the findings from the second year of what is designed to be a long-term, cooperative effort to monitor and track bird populations in the national parks in the Northern Great Plains region.

Inventories

The primary goal of the bird inventories is to document the presence of bird species not yet documented at the parks so that by the end of the inventory effort, at least 90% of the expected breeding species at a park will have been documented. The inventories will also provide an update on the status of previously documented species in each park. *Documented* and *expected* species in each park were classified by the Northern Great Plains I&M Program. Because bird communities are dynamic, and not all species present will be detected on any single visit, the inventories will be carried out annually over a three-year period, after which time a fairly complete assessment of the breeding avifauna within each park should be possible.

Unless otherwise noted, most species documented by the inventories were likely breeding in the vicinity of the parks where they were detected. However, because no effort is being made to document the nesting of birds in each park, the presence of any species in a park does not automatically imply that it is nesting there.

Monitoring

The goal of the bird monitoring is to detect trends in bird populations over time so that interpretations of the health of those populations can be made with confidence. RMBO has designed a landscape-level, habitat-based bird monitoring program that can detect a $\geq 3\%$ change in population size (with 80% power and 90% certainty) over a period of up to 30 years for most common species (Leukering et al. 2000).

Monitoring vs. tracking

In the strictest sense, *monitoring* implies that levels of change can be interpreted with high statistical certainty; *tracking* does not imply that high certainty can be inferred. For most common species, monitoring can be accomplished through random sampling if a sufficient number of samples contain target individuals so that a reasonably precise estimate of density or abundance can be derived. Monitoring can also be accomplished through censuses, where all individuals in a population are counted periodically over time.

While it would be preferable to monitor all bird species within each park, the level of sampling effort and census work required to yield meaningful results likely would be high. Under the current plan, monitoring at the scale of individual parks will be possible only for the most common species. However, due to an existing bird monitoring effort by RMBO and Black Hills National Forest (BHNF), parks in the Black Hills region will be incorporated into an existing monitoring program that is designed to provide landscape-level, habitat-specific population trends for most land bird species across this region (see Panjabi et al. 2001). Thus, parks in the Black Hills region will gain park-specific information on their bird communities, including trends of the most common species, and so long as

BHNF continues its efforts to monitor birds, they will also be able to examine landscape-level trends for many more species the parks support.

Methods

RMBO staff conducted inventories and/or monitoring surveys at each of the seven parks over a 1-4 day period between 24 May and 17 June, 2003. Experienced field biologists with excellent aural and visual bird identification skills conducted all field surveys. Each had completed a training program to review protocols and practice distance estimation prior to conducting field work.

Inventory

RMBO staff generally conducted inventories on the first day of each park visit, as this allowed observers to gain familiarity with the park and communicate with park staff regarding access, locations of habitats, and other logistics. Although observers documented all birds detected at any time during their visit, they devoted one full day, from sunrise to sunset, entirely to the inventory effort. Observers used a checklist provided by the NPS I&M Program (heretofore, the "I&M list") to compile a complete list of all bird species detected during the visit. Observers attempted to cover all habitats and areas of the parks, with particular emphasis on areas not covered by the monitoring effort, although this was not always possible due to the size of the parks and time constraints. Because the primary goal of the inventories was to determine the status of expected species that were not yet documented, observers focused on searching habitats where expected species would most likely be found. Staff also emphasized searching restricted habitats such as wetlands, rivers, creeks, and prairie dog towns. Although they made no special effort locate nests, RMBO staff documented active nests found and in some cases recorded their locations using GPS.

Observers attempted to document nocturnal species on one or more nights of the visit through passive listening in targeted habitats, as well as by using tape-recorded vocalizations of targeted species (including all likely owls and nightjars) in these areas. They generally conducted these nocturnal surveys along roadways and trails within three hours after sunset.

Monitoring

RMBO staff resurveyed the habitat-stratified point transects (Buckland et al. 1993) that were established and conducted in 2002 in order to continue the population monitoring efforts in each park. Exceptions to this included Fort Union Trading Post NHS, where the point transect monitoring effort was discontinued, in Devil's Tower NM, where an entirely new transect was established, and in Fort Laramie NHS, where the latter part of the transect was re-routed to stay within a larger, more continuous stand of the targeted habitat. Protocols for site selection, field surveys, and data analyses followed those developed by

Leukering (2000), and modified by Panjabi (2002). All density estimates in this report were generated using program DISTANCE (Thomas et al. 1998-99).

Results & Discussion

Fort Laramie National Historic Site

Both inventory and monitoring components were completed at Fort Laramie. Good weather provided favorable conditions for both the inventory and monitoring surveys.

Inventory

Between 4-5 June, 2003, RMBO staff observed 61 species at Fort Laramie NHS (Appendix A) that were likely breeding or summering in the area. Ten of these species were not observed during inventories in 2002, whereas nine species observed in 2002 were not observed this year. In 2003, staff observed 5 expected species in the park that previously had not been documented: Ferruginous Hawk, Eastern Phoebe, Pinyon Jay, Tree Swallow and Marsh Wren. Staff also observed two additional expected species, Osprey and Western Grebe, along the North Platte River within 1 kilometer of the park boundary, but they did not include these species on the list of confirmed species for the park. Staff observed one additional expected species in the park, Swainson's Thrush, but this species occurs in this region only as a transient migrant, and should not be expected breeding within the park. Staff also observed one species in the park that was neither listed as expected or document, Eurasian Collared-Dove. This is an exotic species that has been spreading rapidly through North America over the past several years.

Staff searched areas in the vicinity of the fort, the native grasslands north and west of the entrance station and hospital, the non-native grasslands east of the fort, the riparian woodland along the North Platte and Laramie rivers, the riparian woodland along the road to the seasonal camping area, and the grasslands, ponderosa pine woodlands, and rocky cliffs by the Bedlam trail ruts north of the main park. Most bird species were observed in the riparian woodlands along the North Platte and Laramie Rivers. The Ferruginous Hawk and Pinyon Jay were observed on the recently acquired parcel with the trail ruts. In 2003, staff confirmed breeding of Wood Duck, Red-tailed Hawk, Golden Eagle, Eastern Screech-Owl, Red-headed Woodpecker, Cliff Swallow, Eastern Kingbird, and Bullock's Oriole within the park.

Although the high number of bird species observed is due in part to the range of habitat types present (including the riparian woodlands, the rivers, the native grasslands, and the ponderosa pine woodlands), the majority of bird species in the park occur within the riparian habitats. The variety of seral stages, wetland, and vegetation types found in the riparian zone provide a diversity of habitats that support a rich avifauna. However, in a few areas in the riparian woodlands,

understory vegetation is notably absent, and in these areas bird species richness is lower. Ensuring proper regeneration of cottonwoods and willows, in the absence of flooding or other regeneration-promoting disturbance, will be essential to maintaining a diverse and healthy avifauna at Fort Laramie over time.

Fort Laramie National Historic Site plays steward for some noteworthy species of birds in the area. A local concentration of Red-headed Woodpeckers exists in the park, a species that has lost more than 50% of its global population over the last 30 years and is included on the list of Birds of Conservation Concern (USFWS 2002) and the Partners In Flight (PIF) Continental Watch List (Rich et al, in prep.). The species is presently common in the park, but management activities that affect the availability and recruitment of large snags could impact this species. The park also supports a nesting pair of Golden Eagles (USFWS Bird of Conservation Concern, 2002) on the newly acquired land with the Bedlam Trail Ruts. Eagles are highly sensitive to human intrusion during the nesting period, and management of this pair should focus on providing solitude before and during the nesting period.

Monitoring

RMBO staff modified the point transect established in 2002 in low-elevation riparian woodland so that the latter portion of the transect remains within the designated habitat type (Figure 1). Previously, the last 5 points of this transect fell in marginal riparian habitat on the north side of the Laramie River. The transect still starts by the Old Iron Bridge (adjacent to Hwy. 160) over the North Platte River and ends just southwest of the Fort. But where the transect crosses

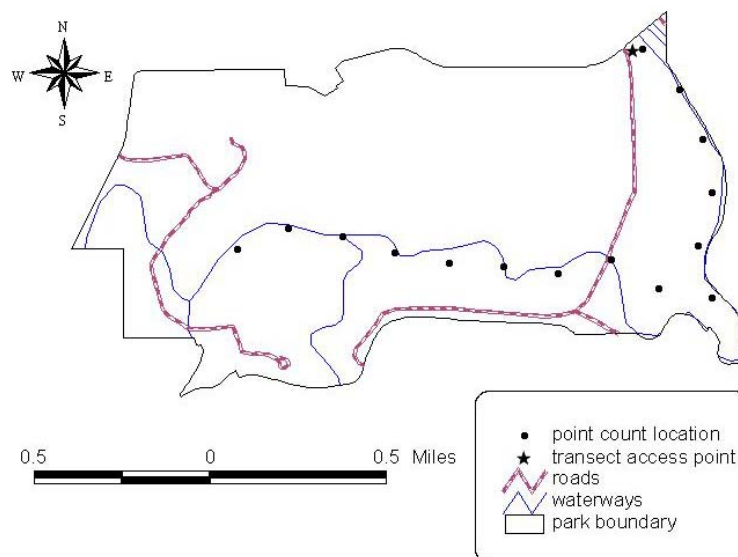


Figure 1. Location of bird monitoring point transect at Fort Laramie National Historic Site, Wyoming, in 2003.

the road near the southeast corner of the park, it now switches to the south side of the river, where more continuous riparian habitat. Fifteen point counts were conducted along this transect.

RMBO staff recorded a total of 497 birds of 42 species on the point transect (Table 1). Average density of all bird species combined was estimated at 9.77 birds/ha (Table 2). Cliff Swallows are excluded from this estimate of all birds as

Table 1. Numbers of bird species recorded on 15 point counts in riparian woodland at Fort Laramie National Historic Site, Wyoming, summer 2003.

Common Name	Number observed	Common Name	Number observed
Wood Duck	1	Black-capped Chickadee	3
Mallard	1	House Wren	41
Ring-necked Pheasant	1	Eastern Bluebird	1
Great Blue Heron	3	American Robin	4
Red-tailed Hawk	3	European Starling	2
Killdeer	2	Cedar Waxwing	4
Spotted Sandpiper	4	Yellow Warbler	22
Rock Pigeon	8	Common Yellowthroat	5
Eurasian Collared-Dove	1	Yellow-breasted Chat	4
Mourning Dove	13	Lark Sparrow	1
Belted Kingfisher	1	Song Sparrow	2
Red-headed Woodpecker	10	Black-headed Grosbeak	8
Downy Woodpecker	3	Blue Grosbeak	4
Hairy Woodpecker	1	Red-winged Blackbird	11
Northern Flicker	1	Western Meadowlark	14
Western Wood-Pewee	12	Common Grackle	12
Western Kingbird	4	Brown-headed Cowbird	5
Eastern Kingbird	16	Orchard Oriole	10
Warbling Vireo	11	Bullock's Oriole	17
Blue Jay	7	American Goldfinch	2
American Crow	3	All bird species	497
Cliff Swallow	219		

they mostly occur locally (around nesting colonies) in very high abundance and thus their inclusion could skew this estimate that otherwise primarily reflects the abundance of woodland species. I estimated density for four individual species: Eastern Kingbird, House Wren, Yellow Warbler, and Bullock's Oriole. These estimates are based on relatively small samples and should be interpreted with caution. These four species should be effectively monitored at Fort Laramie through the current point transect, although negative trends could be difficult to detect for species with very small sample sizes. A better assessment of which species will be effectively monitored through this point transect should be possible after the third year of this investigation.

Table 2. Estimated densities of breeding birds in low-elevation riparian woodland at Fort Laramie National Historic Site, Wyoming, summer 2003.

Species	D	LCL	UCL	CV	N
Eastern Kingbird	0.38	0.24	0.59	0.21	16
House Wren	2.74	1.48	5.08	0.31	41
Yellow Warbler	1.49	0.89	2.52	0.26	22
Bullock's Oriole	0.73	0.43	1.25	0.26	17
All birds	9.77	7.60	12.55	0.13	266

D=Estimated density (birds/ha); LCL=Lower 95% confidence limit; UCL=Upper 95% confidence limit; CV=Coefficient of variation; N= number of observations used to estimate D

Devil's Tower National Monument

Both inventory and monitoring components were completed at Devil's Tower. Good weather provided favorable conditions for both the inventory and monitoring surveys.

Inventory

An RMBO biologist observed 53 species in the park between 28-29 May, 2003 (Appendix B), all of which were likely breeding or summering in the area. Sixteen of these species were not observed in 2002, while 6 species observed in 2002 were not observed this year. The only species not previously documented that was observed during the 2003 inventory was Gray Catbird. Although this species was not listed as expected in the park, it and several other expected, but not documented, species apparently already are documented in the park according to the park's own bird checklist (http://www.nps.gov/deto/bird_list.htm).

The diversity of habitats found at Devil's Tower, including the riparian woodlands, native grasslands, ponderosa pine forests, burned forests, rocky slopes, and steep cliffs contribute to a diverse variety of breeding bird species in the park. One important habitat feature for birds in the park is the tower itself, which apparently hosts large colonies of White-throated Swifts, a species on the Partners In Flight Continental Watch List (Rich et al., in prep.), and in some years, Prairie Falcons, a PIF high regional priority. However, the latter species has not been documented in the park since the start of the inventory effort. The park also supports a local concentration of Red-headed Woodpeckers, a species that has lost more than 50% of its global population in the last 30 years and is included on the Birds of Conservation Concern List (USFWS 2002) and the Partners In Flight Continental Watch List (Rich et al., in prep.)

Monitoring

RMBO staff established a new point transect in ponderosa pine forest, replacing the transect established last year along the Tower Trail. The new transect starts at the northwest corner of the park and systematically covers the pine forest habitat in the park by making frequent turns (Figure 1).

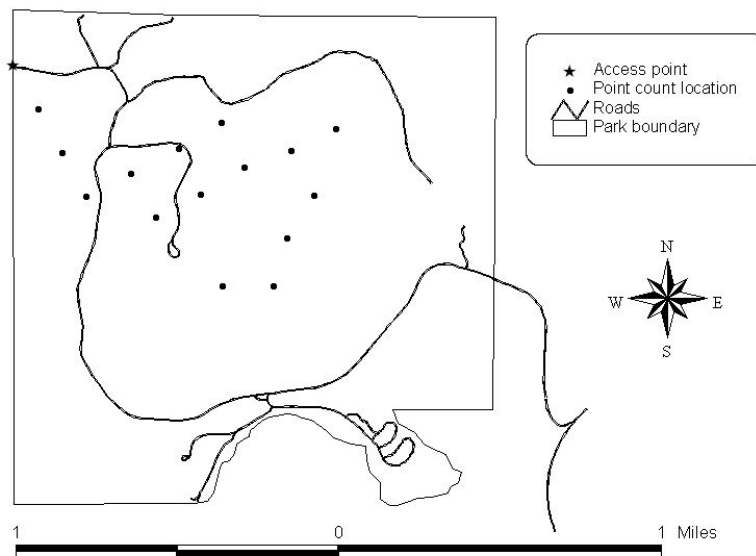


Figure 2. Location of bird monitoring point transect in Devil's Tower National Monument, Wyoming.

Staff recorded 29 bird species on the point transect (Table 3). Average density of all bird species in this habitat was estimated at 2.89 birds/ha, although this estimate excludes aerial foragers (Violet-green Swallow and White-throated Swift) that are not directly associated with the forest habitat per se. I estimated density for four species: Red-breasted Nuthatch, American Robin, Yellow-rumped Warbler and Brown-headed Cowbirds (Table 4). However, these estimates are based on relatively small samples and should be interpreted with caution. The results suggest that these species should be effectively monitored at Devil's Tower through the current point transect, although negative trends could be difficult to detect for species with small sample sizes. A better assessment of which species should be effectively monitored under the current program will be possible after the third year of this effort.

Table 3. Numbers of breeding bird species recorded on 15 point counts in ponderosa pine forest at Devil's Tower National Monument, Wyoming, summer 2003.

Species	Number observed	Species	Number observed
Wild Turkey	2	Brown Creeper	1
Turkey Vulture	2	Rock Wren	3
Rock Pigeon	3	House Wren	5
Mourning Dove	2	Mountain Bluebird	1
White-throated Swift	73	Townsend's Solitaire	5
Red-headed Woodpecker	1	American Robin	22
Hairy Woodpecker	2	Yellow-rumped Warbler	14
Northern Flicker	3	Ovenbird	3
Western Wood-Pewee	6	Western Tanager	13

Species	Number observed	Species	Number observed
Plumbeous Vireo	6	Chipping Sparrow	13
Warbling Vireo	3	Dark-eyed Junco	1
Violet-green Swallow	14	Black-headed Grosbeak	2
Black-capped Chickadee	4	Brown-headed Cowbird	16
Red-breasted Nuthatch	14	Pine Siskin	8
White-breasted Nuthatch	2	All bird species	244

Table 4. Estimated densities of breeding birds in ponderosa pine forest at Devil's Tower National Monument, Wyoming, summer 2003.

Species	D	LCL	UCL	CV	N
Red-breasted Nuthatch	0.34	0.11	1.03	0.57	14
American Robin	0.71	0.32	1.58	0.41	22
Yellow-rumped Warbler	0.30	0.15	0.61	0.35	14
Brown-headed Cowbird	0.71	0.41	1.20	0.26	16
All bird species	2.89	2.24	3.74	.13	153

D=Estimated density (birds/ha); LCL=Lower 95% confidence limit; UCL=Upper 95% confidence limit; CV=Coefficient of variation; N= number of observations used to estimate D

Fort Union Trading Post National Historic Site

RMBO staff only conducted inventories at Fort Union this year, as there is not sufficient habitat available within the park's borders to effectively utilize point transects to monitor birds within any single habitat type. Weather was favorable for most of the day while the riparian habitat was inventoried, although conditions deteriorated in the latter part of the day when the grasslands were inventoried and may have affected detectability of some birds there.

Inventory

RMBO staff detected 70 species in the park during 3-4 June, 2002 (Appendix C) that were likely breeding or summering in the area. Eleven of these species were not detected last year, while 11 other species that were recorded in 2002 were not observed this year. Eight additional expected species were confirmed this year: Marbled Godwit, Wilson's Phalarope, Least Tern, Eastern Screech-Owl, Belted Kingfisher, Tree Swallow, White-breasted Nuthatch, and Brown Thrasher. Great Blue Heron, Hairy Woodpecker, and Red-headed Woodpecker were confirmed this year, and although they are listed as documented for the park, they were not observed in 2002. Caspian Tern, a species that is neither documented nor expected in the park, according to the I&M list, was recorded in 2003.

Staff searched all areas of the park, including the riparian woodland and wetlands along the north side of the Missouri River, the woodlands on the south side of the Missouri River, the non-native grasslands south of the highway, and

the grasslands north of the highway along the stakes marking the trail to the overlook.

The diversity of habitats, including the riparian thickets, deciduous woodlands, wetlands, shrublands, and grasslands, contribute to the richness and abundance of birds at Fort Union. However, like many of the other parks in this region, it is the riparian habitats that support the vast majority of all birds and bird species in the park, especially neotropical migrant songbirds. The river itself also provides habitat for some unique species not found elsewhere in the park (e.g., Western Grebe, Forster's and Caspian Tern, Spotted Sandpiper), although it is not certain that these birds were actually breeding within the park boundaries. In contrast, the grasslands in the park, which are dominated by non-native grasses, support relatively few birds, other than Western Meadowlarks and an occasional Bobolink, Vesper Sparrow, or Eastern Kingbird. Nonetheless, this area could be important for some low-density grassland species that may use this area as part of their home range (e.g. raptors, shrikes, grouse). Restoration of this area to native grasses and shrubs may increase the use of this area by other grassland birds.

Monitoring

The point transect established at Fort Union in 2002 was not continued this year, as the riparian habitat in the park is not extensive enough to be sampled using this method. However, if there is interest in monitoring birds at this park, other options are available. For example, a line transect could be conducted in this area, and could provide sufficient numbers of detections of some species to allow for monitoring. Alternatively, spot mapping could be used to provide a census of all birds in the riparian woodland, or even the entire park. RMBO is open to discussing these options with the NPS I&M program.

Jewel Cave National Monument

Both inventory and monitoring components were completed under favorable weather conditions at Jewel Cave.

Inventory

RMBO staff observed 46 bird species in Jewel Cave during 25-26 May, 2003 (Appendix D) that were likely breeding or summering in the area. Ten of these species were not recorded in 2002, while eight species observed in 2002 were not recorded this year. Three additional expected species were confirmed for the park this year: Sharp-shinned Hawk, American Kestrel, and Red-headed Woodpecker. Four additional documented species that were not observed last year, Red-tailed Hawk, Downy Woodpecker, Cordilleran Flycatcher, and Red-winged Blackbird, were recorded in 2003. Four additional species that are not listed as expected or documented in the park, and were not observed last year, were also recorded this year: Western Kingbird, Rock Wren, Cedar Waxwing,

and Spotted Towhee. Areas searched included Lithograph Canyon, Hell Canyon, the visitor center and surroundings forest, the burned forest north of Highway 16, and the sewage ponds.

Jewel Cave supports fewer habitat types than some of the other parks, and thus hosts fewer bird species. The predominant habitat in the park, since the fall of 2000 when the Jasper Fire burned almost 85,000 acres in the Black Hills, is burned ponderosa pine forest. However, this burned area is interspersed with areas of unburned pine and open meadows. Deciduous vegetation is limited, occurring primarily in a short stretch of Lithograph Canyon, and locally in some smaller canyons. The sewage ponds are the only source of permanent water in the park. The patchwork of burned and unburned ponderosa pine forest in the park has created habitat for a suite of species that probably were less common or absent in the park prior to the fire. These include birds such as the Black-backed Woodpecker, Red-headed Woodpecker, Eastern Bluebird and Mountain Bluebird, as well as other open-country birds such as Indigo Bunting, Vesper Sparrow and Field Sparrow.

It is important to note that some of these species that depend on post-fire habitats are high priorities for conservation, from either a regional or continental perspective. It is therefore significant that the average density of Black-backed Woodpeckers in Jewel Cave is almost five times greater than that across the rest of the Jasper burn area. This is likely due to the mature and old-growth pre-fire condition of the forest, and the absence of post-fire logging, both of which are important factors in determining Black-backed Woodpecker use in burned forests.

Monitoring

The point transect established in burned ponderosa pine forest in 2002 was resurveyed in 2003, and this year all 15 points were completed. This transect starts near the south entrance to the park on Lithograph Canyon Road (278 Rd) and heads northward, crosses Highway 16, turns east just before the northern boundary, and then turns south just before the eastern boundary (Figure 3).

RMBO staff recorded 29 species on the point transect (Table 5). The average density of all bird species combined was estimated at 3.5 birds/ha in this habitat (Table 6). This estimate is significantly lower than that made last year, largely due to the absence of Red Crossbills in 2003. I estimated density for six species: Black-backed Woodpecker, Dusky Flycatcher, American Robin, Chipping Sparrow, and Brown-headed Cowbird. However, these estimates are based on relatively small samples and should be interpreted with caution. The results suggest that these species should be effectively monitored at Devil's Tower through the current point transect, although negative trends could be difficult to detect for species with small sample sizes. A better assessment of which species will be effectively monitored under using the current transect should be possible after the third year of this effort.

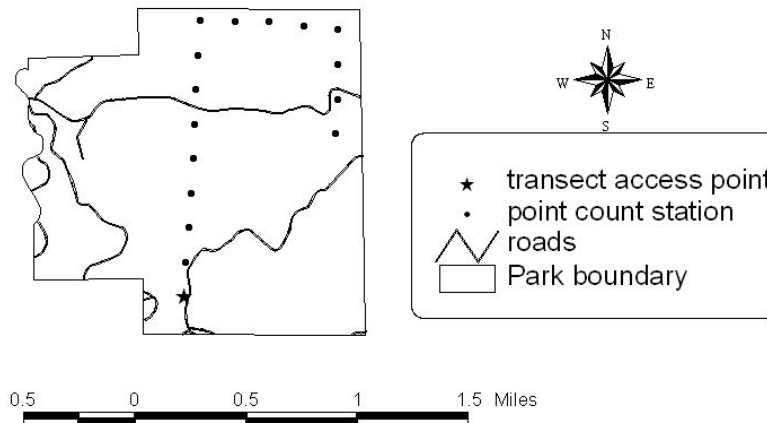


Figure 3. Location of point transect for bird monitoring in Jewel Cave National Monument, South Dakota, summer 2003.

Table 5. Numbers of breeding bird species recorded on 15 point counts in 3-year post-fire ponderosa pine forest at Jewel Cave National Monument, South Dakota, summer 2003.

Species	Number observed	Species	Number observed
Turkey Vulture	2	Mountain Bluebird	1
Mourning Dove	2	Townsend's Solitaire	1
Hairy Woodpecker	9	American Robin	22
Black-backed Woodpecker	12	Cedar Waxwing	1
Northern Flicker	2	Yellow-rumped Warbler	18
Western Wood-Pewee	5	Ovenbird	8
Dusky Flycatcher	15	MacGillivray's Warbler	2
Cordilleran Flycatcher	1	Western Tanager	13
Plumbeous Vireo	11	Chipping Sparrow	22
Warbling Vireo	8	Dark-eyed Junco	9
American Crow	2	Red-winged Blackbird	1
Violet-green Swallow	4	Brown-headed Cowbird	15
Black-capped Chickadee	2	Pine Siskin	4
Red-breasted Nuthatch	7	American Goldfinch	4
Brown Creeper	1	All bird species	204

Table 6. Estimated densities of breeding birds in 3-year post-fire ponderosa pine forest (3 yr. post-fire) at Jewel Cave National Monument, South Dakota, summer 2003.

Species	D	LCL	UCL	CV	N
Black-backed Woodpecker	0.17	0.08	0.33	0.32	12
Dusky Flycatcher	0.35	0.17	0.72	0.36	15
American Robin	0.48	0.30	0.77	0.24	22

Species	D	LCL	UCL	CV	N
Yellow-rumped Warbler	0.38	0.21	0.71	0.31	18
Chipping Sparrow	1.40	0.62	3.16	0.42	22
Brown-headed Cowbird	0.36	0.21	0.62	0.27	15
All bird species	3.50	2.82	4.34	0.10	194

D=Estimated density (birds/ha); LCL=Lower 95% confidence limit; UCL=Upper 95% confidence limit; CV=Coefficient of variation; N= number of observations used to estimate D

Knife River Indian Villages National Historic Site

Both inventory and monitoring surveys were conducted at Knife River. Rain and wind posed challenges for the inventory, and may have affected the detectability of birds during the grassland point transect. One additional day was spent inventorying the park in order to compensate for the reduced detectability of birds due to the weather. Weather conditions were favorable for the riparian transect.

Inventory

RMBO staff observed 79 species during 5-8 June, 2003 (Appendix E). All but two of these, Alder Flycatcher and Swainson's Thrush, were likely breeding or summering in the area. Thirteen species were recorded in the park in 2003 that were not detected last year, whereas eight species recorded in 2002 were not detected this year. The 13 additional species detected this year were all already listed as documented for the park. No additional expected species were observed in 2003. Staff searched all areas of the park, including the North Woods, the grasslands north of the Big Hidatsa Village Road, the grasslands north, south and east of the visitor center, the riparian woodlands along both sides of the Knife River, the riparian woodlands around the confluence of the Knife and Missouri rivers, and the riparian woodlands north of the Stanley town campground.

The high number of bird species observed in the park is due largely to the great extent and condition of the diverse habitats found here, including the riparian woodlands, the rivers and sandbars, the native grasslands and the hayfields. By far, the greatest number of bird species was found in the "North Woods" area. This area consists of an exceptionally dense, mature riparian forest, with an abundance of dead and downed wood, and adjacent clearings, shrublands and wetlands. An area with similar diversity and abundance of birds as the North Woods is located at the south end of the park, just north of the Stanley town park campground. However, this area is much smaller than the North Woods, and it consequently supports fewer birds.

The diversity and abundance of birds in the North Woods contrast markedly with those in the woodlands that appear to have been treated with fire and/or thinning. Many of the riparian forest birds found in the North Woods, such as Cooper's Hawk, Eastern Screech Owl, Black-billed Cuckoo, Black-and-white Warbler, Ovenbird and American Redstart, were not found in these open woodlands. The

prevalence of many other forest birds, such as Least Flycatcher, Red-eyed Vireo and Yellow Warbler, was also noticeably lower in these burned woodlands. In contrast, birds that were more abundant in these burned woodlands included Western Kingbird and Lark Sparrow. I strongly recommend not treating the North Woods in any way that would reduce the density of live and dead vegetation in this area, as doing so could negatively impact the rich bird life presently there.

Monitoring

The two point transects established at Knife River in 2002 were resurveyed in 2003 (Figure 4). One transect is in dense riparian woodland and the other is in grassland (mostly native prairie, but partially in old hay fields).

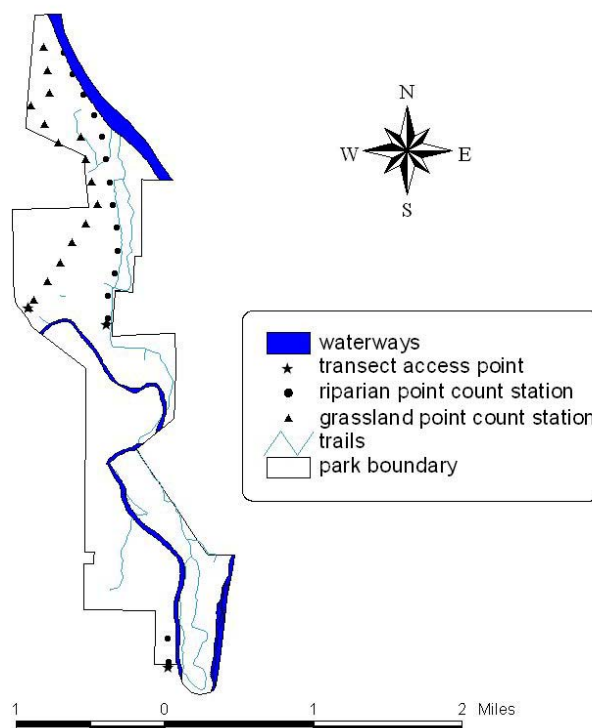


Figure 4. Locations of point transects for bird monitoring in Knife River Indian Villages National Historic Site, North Dakota.

Grasslands

Staff recorded 35 species on the point transect in the grassland habitat (Table 7), although most of these were actually using the adjacent forest and shrublands. Average density of all bird species combined was estimated at 4.51 birds/ha along this transect. I estimated density for three individual species: Bobolink, Grasshopper Sparrow, and Western Meadowlark (Table 8). Densities of two grassland species, Bobolink and Grasshopper Sparrow, were exceptionally high at Knife River. If density is assumed to be positively correlated with habitat quality, then Knife River is providing high quality habitat for these species.

Table 7. Numbers of breeding bird species recorded on 15 point counts in grasslands at Knife River Indian Villages National Historic Site, North Dakota, summer 2003.

Common Name	Number observed	Common Name	Number observed
Canada Goose	7	Yellow Warbler	6
Ring-necked Pheasant	10	Ovenbird	2
Great Blue Heron	1	Common Yellowthroat	9
Red-tailed Hawk	1	Spotted Towhee	4
Upland Sandpiper	2	Clay-colored Sparrow	12
California Gull	1	Field Sparrow	4
Mourning Dove	5	Vesper Sparrow	1
Common Nighthawk	1	Lark Sparrow	1
Downy Woodpecker	1	Grasshopper Sparrow	32
Northern Flicker	2	Song Sparrow	4
Say's Phoebe	1	Black-headed Grosbeak	1
Eastern Kingbird	6	Bobolink	75
Black-billed Magpie	1	Red-winged Blackbird	10
American Crow	3	Western Meadowlark	25
House Wren	3	Brewer's Blackbird	1
American Robin	3	Brown-headed Cowbird	6
Gray Catbird	3	American Goldfinch	3
Cedar Waxwing	2	All bird species	249

Table 8. Estimated densities of breeding birds in grasslands at Knife River Indian Villages National Historic Site, North Dakota, summer 2003.

Species	D	LCL	UCL	CV	N
Grasshopper Sparrow	1.00	0.72	1.39	0.15	31
Bobolink	2.08	1.34	3.22	0.21	73
Western Meadowlark	0.18	0.11	0.29	0.24	25
All bird species	4.51	3.49	5.84	0.13	244

D=Estimated density (birds/ha); LCL=Lower 95% confidence limit; UCL=Upper 95% confidence limit; CV=Coefficient of variation; N= number of observations used to estimate D

Bobolinks occur in both the non-native grasslands and the native mixed-grass prairie, whereas Grasshopper Sparrows are limited to the mixed-grass prairie. Bobolinks occurred in greater density than other bird species in this habitat, with approximately 2 birds, or 1 pair, per hectare. The results suggest that these three grassland species should be effectively monitored at Knife River through the current point transect, although negative trends could be difficult to detect for species with low sample sizes.

Riparian woodland

Staff recorded 45 species on the transect in dense riparian woodland (Table 9), more species than on any other transect in any park in this region. Average density of all bird species combined was estimated at 23.86 birds/ha, considerably higher than in any habitat in any other park surveyed (Table 10). However, this density estimate represents a 50% drop in overall bird density in

this area since 2002, and several species that were recorded in greater numbers in 2002 were detected less frequently this year, or not at all. I estimated density for seven individual species in this habitat: Least Flycatcher, Red-eyed Vireo, House Wren, Yellow Warbler, American Redstart and Ovenbird, and Common Yellowthroat. The results suggest that these six species should be effectively monitored at Knife River through the current point transect in dense riparian woodland, although negative trends could be difficult to detect for species with small sample size. A better assessment of which species will be effectively monitored under the current program should be possible after the third year of this effort.

The high density and richness of bird species, along with the presence of several rare or uncommon species, underscore the value of this riparian forest toward the avifauna of Knife River.

Table 9. Numbers of breeding bird species recorded on 15 point counts in dense riparian woodland at Knife River Indian Villages National Historic Site, North Dakota, summer 2003.

Common Name	Number observed	Common Name	Number observed
Canada Goose	16	Swainson's Thrush	1
Mallard	3	American Robin	7
Ring-necked Pheasant	10	Gray Catbird	4
Wild Turkey	3	Brown Thrasher	3
Great Blue Heron	1	Cedar Waxwing	3
Killdeer	1	Yellow Warbler	27
Upland Sandpiper	2	Black-and-white Warbler	1
Ring-billed Gull	2	American Redstart	46
Mourning Dove	13	Ovenbird	17
Red-headed Woodpecker	1	Common Yellowthroat	18
Hairy Woodpecker	3	Yellow-breasted Chat	2
Northern Flicker	1	Spotted Towhee	9
Alder Flycatcher	2	Clay-colored Sparrow	9
Least Flycatcher	17	Field Sparrow	7
Great Crested Flycatcher	1	Song Sparrow	10
Warbling Vireo	1	Black-headed Grosbeak	3
Red-eyed Vireo	21	Lazuli Bunting	2
Blue Jay	1	Bobolink	2
American Crow	8	Red-winged Blackbird	9
Bank Swallow	32	Western Meadowlark	4
Black-capped Chickadee	3	Brown-headed Cowbird	14
White-breasted Nuthatch	2	American Goldfinch	18
House Wren	24	All birds	384

Table 10. Estimated densities of breeding birds in dense riparian woodland at Knife River Indian Villages National Historic Site, North Dakota, summer, 2003.

Species	D	LCL	UCL	CV	N
Least Flycatcher	0.95	0.47	1.94	0.35	17
Red-eyed Vireo	3.61	1.93	6.75	0.31	21
House Wren	3.06	1.36	6.90	0.41	24
Yellow Warbler	2.86	1.73	4.74	0.25	26
American Redstart	6.14	4.06	9.29	0.20	46
Ovenbird	0.69	0.36	1.32	0.32	16
Common Yellowthroat	0.69	0.30	1.57	0.42	16
All bird species	23.86	19.10	29.81	0.11	284

D=Estimated density (birds/ha); LCL=Lower 95% confidence limit; UCL=Upper 95% confidence limit; CV=Coefficient of variation; N= number of observations used to estimate D

Mount Rushmore National Memorial

Both inventory and monitoring surveys were carried out at Mount Rushmore. Sunny weather provided generally good conditions during both surveys.

Inventory

RMBO staff observed 33 species during 11-12 June, 2003 (Appendix F), all of which were likely breeding or summering in the area. Five species recorded in 2003 were not detected last year, whereas six species recorded in 2002 were not detected this year. Of the new species detected in 2003, Plumbeous Vireo was already listed as documented in the park, and three others, Blue Jay, MacGillivray's Warbler, and Song Sparrow, were not listed as either expected or documented. The only additional expected species that was confirmed this year was Cassin's Finch. Areas searched included Starling Basin west and south from highway 244 to the park boundary, the rock spires around Mount Rushmore, the visitor parking area, the area along the road to the staff housing, and the pine forest south of highway 244 across from the parking area.

The habitat at Mount Rushmore consists primarily of ponderosa pine forest, although a number of vegetative, hydrologic and geologic features contribute to a more diverse landscape. The pine forest is comprised of a range of age classes, but is mostly mature or old-growth. In a few places, small stands of aspen provide habitat for species that require broad-leaved vegetation, such as Dusky Flycatcher, Warbling Vireo and Black-headed Grosbeak. A small stand of white spruce along the bottom of Starling Basin provides habitat for Swainson's Thrush and Ruby-crowned Kinglet. A wetland in the bottom of Starling Basin also adds to the diversity of habitats within the park. The tall rock spires around Mount Rushmore provide habitat for cliff nesting species, such as Rock Pigeon, White-throated Swift, Canyon Wren and Violet-green Swallow. The clearings around the staff housing units appear suitable for some open-country birds, but no additional species were recorded there.

Monitoring

The point transect established in ponderosa pine forest in 2002 was resurveyed this year (Figure 5). Staff recorded 28 species on the point transect (Table 11). Average density of all bird species combined was estimated at 4.48 birds/ha in this habitat (Table 12). However, I excluded observations of White-throated Swifts and Violet Green Swallows from this estimate, as these species are more typically associated with cliffs and open air, rather than ponderosa pine forest per se. I estimated density for two species: American Robin and Yellow-rumped Warbler. The results suggest that Yellow-rumped Warbler should be effectively monitored via the current point transect, although negative trends could be difficult to detect for species with small sample sizes. A better assessment of which species should be adequately monitored under the current point transect will be possible after the third year of this investigation.

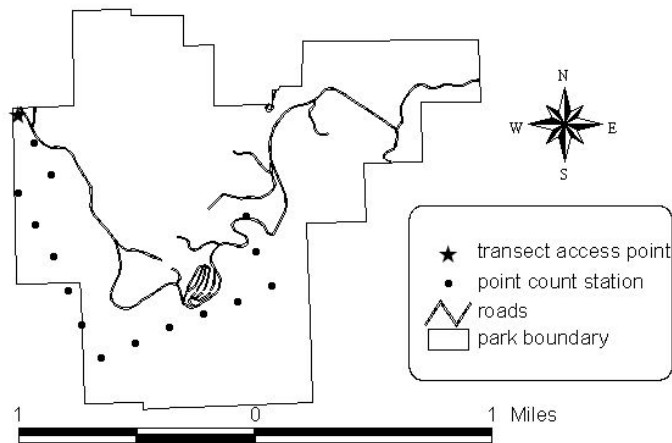


Figure 5. Location of point transect for bird monitoring in Mount Rushmore National Memorial, South Dakota.

Table 11. Numbers of breeding bird species recorded on 15 point counts in ponderosa pine forest at Mount Rushmore National Memorial, South Dakota, summer, 2003.

Species	Number observed	Species	Number observed
Turkey Vulture	1	Ruby-crowned Kinglet	2
White-throated Swift	18	Townsend's Solitaire	4
Hairy Woodpecker	5	Swainson's Thrush	7
Unknown Woodpecker	1	American Robin	28
Northern Flicker	3	Yellow-rumped Warbler	21
Dusky Flycatcher	1	Ovenbird	8
Cordilleran Flycatcher	7	MacGillivray's Warbler	2
Plumbeous Vireo	1	Common Yellowthroat	1

Species	Number observed	Species	Number observed
Warbling Vireo	14	Western Tanager	7
Violet-green Swallow	8	Chipping Sparrow	10
Black-capped Chickadee	5	Dark-eyed Junco	7
Red-breasted Nuthatch	16	Red Crossbill	6
Brown Creeper	4	Pine Siskin	4
Rock Wren	2	All bird species	196
Canyon Wren	3		

Table 12. Estimated densities of breeding birds in ponderosa pine forest at Mount Rushmore National Memorial, South Dakota, summer 2003.

Species	D	LCL	UCL	CV	N
American Robin	0.98	0.59	1.60	0.25	28
Yellow-rumped Warbler	0.57	0.38	0.86	0.20	21
All bird species	4.24	3.21	5.61	0.14	165

D=Estimated density (birds/ha); LCL=Lower 95% confidence limit; UCL=Upper 95% confidence limit; CV=Coefficient of variation; N= number of observations used to estimate D

Wind Cave National Park

Two point transects were conducted at Wind Cave for bird monitoring. High winds may have affected the numbers of birds detected on both transects, although conditions during both transects were within acceptable limits of the protocol. No additional effort was made to inventory birds at Wind Cave, as inventories have already been completed in this park.

Monitoring

The two point transects established at Wind Cave in 2002 were resurveyed this year (Figure 6). The transect in foothill riparian habitat was surveyed on 19 June, 2003, and the one in mixed-prairie grassland was surveyed on 20 June, 2003.

Foothill riparian

The transect in foothill riparian habitat starts at the west entrance to the park on Highway 385 and follows Spring Creek downstream to its confluence with Beaver Creek, and then continues downstream along Beaver Creek. Although this transect follows the creek closely, not all count stations fall in similar vegetation types. The vegetation along the creek varies from dense riparian brush, to light woodland, to open wet meadows and grasslands. Stands of live and burned ponderosa pine are present on hillsides adjacent to much of the creek. In some places, the creek runs through canyons with steep cliffs. Two additional point count stations have been added to this transect to compensate for the low number of riparian woodland birds recorded at two count stations that fall in open areas. Thus a total of 17 count stations exist along this transect.

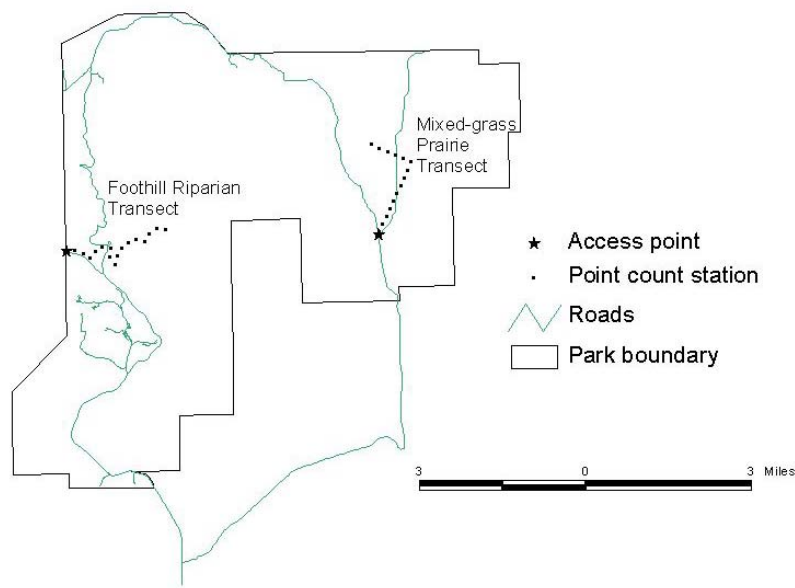


Figure 6. Locations of point transects for bird monitoring in Wind Cave National Park, South Dakota.

RMBO staff detected 40 bird species along the riparian transect (Table 13). The average density of all birds combined was estimated at 5.57 birds/ha in this habitat (Table 14). The richness of bird species along this transect was high due to the diversity and good condition of habitats along Spring and Beaver Creeks, including the dense riparian thickets, deciduous woodlands, ponderosa pine forests, burned pine stands, grasslands, wet meadows, and cliffs. I estimated density for five individual species: Western Wood-Pewee, House Wren, American Robin, Yellow Warbler, and Common Yellowthroat. These species should be monitored via the current point transect, although negative trends could be difficult to detect due to small sample sizes in some cases. A better assessment of which species should be adequately monitored under the current point transect will be possible after the third year of this investigation. However, I strongly recommend adding at least one other point transects within the park in similar riparian habitat. This should roughly double the number of observations of most species, and increase the number of species for which we are able to detect trends.

Table 13. Numbers of breeding bird species recorded on 17 point counts in foothill riparian woodland at Wind Cave National Park, South Dakota, summer 2003.

Species	Number observed	Species	Number observed
Upland Sandpiper	3	Townsend's Solitaire	1
Mourning Dove	1	American Robin	16
White-throated Swift	13	Cedar Waxwing	14
Belted Kingfisher	1	Yellow Warbler	16

Species	Number observed	Species	Number observed
Downy Woodpecker	1	Yellow-rumped Warbler	1
Northern Flicker	5	American Redstart	3
Western Wood-Pewee	16	Common Yellowthroat	16
Dusky Flycatcher	1	Yellow-breasted Chat	7
Cordilleran Flycatcher	9	Western Tanager	8
Eastern Phoebe	1	Spotted Towhee	15
Eastern Kingbird	3	Chipping Sparrow	2
Plumbeous Vireo	4	Vesper Sparrow	3
Warbling Vireo	1	Black-headed Grosbeak	3
American Crow	12	Lazuli Bunting	7
Violet-green Swallow	4	Western Meadowlark	8
Barn Swallow	2	Brewer's Blackbird	5
Black-capped Chickadee	5	Brown-headed Cowbird	1
Red-breasted Nuthatch	7	Red Crossbill	5
Rock Wren	1	American Goldfinch	6
Canyon Wren	2	All bird species	243
House Wren	14		

Table 14. Estimated densities of breeding bird species in foothill riparian habitat at Wind Cave National Park, South Dakota, summer 2003.

Species	D	LCL	UCL	CV	N
Western Wood-Pewee	0.20	0.07	0.62	0.57	16
House Wren	0.61	0.22	1.67	0.52	14
American Robin	0.19	0.09	0.38	0.35	16
Yellow Warbler	0.66	0.34	1.29	0.34	16
Common Yellowthroat	0.80	0.30	2.09	0.49	16
All bird species	5.57	4.03	7.70	0.17	232

D=Estimated density (birds/ha); LCL=Lower 95% confidence limit; UCL=Upper 95% confidence limit; CV=Coefficient of variation; N= number of observations used to estimate D

Mixed-grass prairie

The transect in mixed-prairie grassland begins at the intersection of NPS 5 and NPS 6 roads, in the northern end of the park, and heads northeast for the first ten counts, and then turns to the northwest for the last 5 counts. Although this transect primarily samples mixed-prairie grassland, it crosses a sparse riparian woodland at two points, and therefore a few riparian species can be found along this route. In 2003, the observer had to make a minor adjustment to the course of this transect to avoid a group of bison.

Staff detected 17 species along the transect in mixed-grass prairie (Table 15). The average density of all birds species combined was estimated at 2.52 birds/ha in this habitat (Table 16). I estimated density for two species in this habitat, Grasshopper Sparrow and Western Meadowlark. The numbers of Grasshopper Sparrows detected along this transect more than quadrupled between 2002 and 2003, and their density surpassed that of Western Meadowlark. Grasshopper Sparrow abundance fluctuates between years,

without additional survey effort to increase sample size, it may not be possible to monitor this species every year. The somewhat later timing of the surveys in 2003, may have contributed to lower numbers of Upland Sandpipers and Sharp-tailed Grouse that were recorded this year, as these species are early nesters and are more detectable earlier in the season. I strongly recommend adding at least one more point transect in mixed-grass prairie to increase our ability to detect trends for a greater number of species in this habitat in the park.

Although the density and richness of bird species is relatively low in the mixed-grass prairie, this habitat supports a unique suite of birds, including Upland Sandpiper, Sharp-tailed Grouse and Grasshopper Sparrow, in addition to others that may occur here but were not detected on this single survey. The number of Upland Sandpipers in this part of Wind Cave far exceeds the number of this species that are typically encountered anywhere else in the Black Hills. While I have observed Upland Sandpipers in Custer State Park, I have not observed them in any of the grassland areas on the Black Hills National Forest. Although no Sharp-tailed Grouse were observed on this transect this year, this species is also more abundant in Wind Cave than in other parts of the Black Hills.

Table 15. Numbers of breeding bird species recorded on 15 point counts in mixed-prairie grassland at Wind Cave National Park, South Dakota, summer 2003.

Species	Number observed	Species	Number observed
Great Blue Heron	1	Barn Swallow	2
American Kestrel	1	European Starling	6
Killdeer	3	Vesper Sparrow	1
Upland Sandpiper	12	Grasshopper Sparrow	28
Mourning Dove	1	Red-winged Blackbird	1
Northern Flicker	1	Western Meadowlark	115
Eastern Kingbird	1	Brewer's Blackbird	7
American Crow	7	Brown-headed Cowbird	3
Northern Rough-winged Swallow	1	All birds	191

Table 16. Relative abundance and estimated density of breeding bird species in mixed-grass prairie at Wind Cave National Park, South Dakota, summer 2003.

Species	D	D LCL	D UCL	D CV	N
Grasshopper Sparrow	1.17	0.75	1.82	0.22	28
Western Meadowlark	0.87	0.70	1.08	0.11	115
All bird species	2.52	2.09	3.05	0.10	177

D=Estimated density (birds/ha); LCL=Lower 95% confidence limit; UCL=Upper 95% confidence limit; CV=Coefficient of variation; N= number of observations used to estimate D

Acknowledgements

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Appendix A. I&M status of birds and results of RMBO inventories at Fort Laramie National Historic Site.

Common Name	I&M status	2002	2003
Canada Goose	doc		
Wood Duck	exp	X	X
Gadwall	exp		
American Wigeon	doc		
Mallard	doc	X	X
Blue-winged Teal	exp		
Northern Shoveler	exp		
Northern Pintail	doc		
Green-winged Teal	doc		
Common Merganser	doc	X	
Ruddy Duck	exp		
Gray Partridge	exp		
Ring-necked Pheasant	exp	X	X
Greater Sage-Grouse	exp		
Sharp-tailed Grouse	exp		
Wild Turkey	doc	X	
Pied-billed Grebe	exp		
Eared Grebe	exp		
Western Grebe	exp		X
American White Pelican	exp		
Double-crested Cormorant	exp	X	
American Bittern	exp		
Great Blue Heron	doc	X	X
Snowy Egret	exp		
Green Heron	doc		
Black-crowned Night-Heron	doc		
White-faced Ibis	exp		
Turkey Vulture	exp	X	X
Osprey	exp		X
Bald Eagle	exp		
Northern Harrier	exp		
Sharp-shinned Hawk	exp		
Cooper's Hawk	doc	X	
Swainson's Hawk	exp		
Red-tailed Hawk	doc		X
Ferruginous Hawk	exp		X
Golden Eagle	doc		X
American Kestrel	doc	X	X
Merlin	exp		
Prairie Falcon	exp		
Virginia Rail	exp		
Sora	exp		
American Coot	doc		
Semipalmated Plover	doc		
Killdeer	doc	X	X
Black-necked Stilt	doc		

Common Name	I&M status	2002	2003
American Avocet	exp		
Willet	exp		
Spotted Sandpiper	doc	X	X
Upland Sandpiper	exp		
Long-billed Curlew	exp		
Wilson's Snipe	exp	X	
Wilson's Phalarope	exp		
Ring-billed Gull	exp		
California Gull	exp		
Caspian Tern	exp		
Forster's Tern	exp		
Rock Pigeon	exp	X	X
Eurasian Collared-Dove			X
Mourning Dove	doc	X	X
Black-billed Cuckoo	exp		
Yellow-billed Cuckoo	exp		
Barn Owl	exp		
Western Screech-Owl	doc		
Eastern Screech-Owl	doc	X	X
Great Horned Owl	doc		
Burrowing Owl	exp		
Long-eared Owl	exp		
Short-eared Owl	exp		
Common Nighthawk	doc	X	X
Common Poorwill	exp		
White-throated Swift	exp		
Belted Kingfisher	doc		X
Lewis's Woodpecker	exp		
Red-headed Woodpecker	doc	X	X
Downy Woodpecker	doc	X	X
Hairy Woodpecker	doc	X	X
Northern Flicker	doc	X	X
Olive-sided Flycatcher	doc		
Western Wood-Pewee	exp	X	X
Least Flycatcher	exp		
Eastern Phoebe	exp		X
Say's Phoebe	doc	X	X
Cassin's Kingbird	exp		
Western Kingbird	doc	X	X
Eastern Kingbird	doc	X	X
Loggerhead Shrike	doc	X	X
Plumbeous Vireo	exp		
Warbling Vireo	exp	X	X
Red-eyed Vireo	exp	X	
Gray Jay	exp		
Steller's Jay	doc		
Blue Jay	doc	X	X
Pinyon Jay	exp		X
Black-billed Magpie	doc	X	X

Common Name	I&M status	2002	2003
American Crow	doc	X	X
Common Raven	doc		
Horned Lark	exp		
Tree Swallow	exp		X
Violet-green Swallow	doc	X	X
Northern Rough-winged Swallow	exp		
Bank Swallow	exp		
Cliff Swallow	doc	X	X
Barn Swallow	doc	X	X
Black-capped Chickadee	exp	X	X
Mountain Chickadee	exp		
Juniper Titmouse	doc		
Red-breasted Nuthatch	exp		
White-breasted Nuthatch	exp	X	
Pygmy Nuthatch	exp		
Brown Creeper	doc		
Rock Wren	doc	X	X
Canyon Wren	exp		
House Wren	doc	X	X
Marsh Wren	exp		X
Blue-gray Gnatcatcher	exp		
Eastern Bluebird	exp	X	X
Western Bluebird	exp		
Mountain Bluebird	exp		
Townsend's Solitaire	exp		
Veery	exp		
Swainson's Thrush	exp		X
American Robin	doc	X	X
Gray Catbird	exp		
Northern Mockingbird	doc		
Sage Thrasher	doc		
Brown Thrasher	doc	X	X
European Starling	doc	X	X
Cedar Waxwing	exp	X	X
Yellow Warbler	doc	X	X
Yellow-rumped Warbler	exp		
American Redstart	exp		
Ovenbird	exp		
MacGillivray's Warbler	doc		
Common Yellowthroat	exp	X	X
Yellow-breasted Chat	doc	X	X
Scarlet Tanager	exp		
Western Tanager	doc		
Green-tailed Towhee	exp		
Spotted Towhee	doc	X	
Chipping Sparrow	doc	X	
Clay-colored Sparrow	exp		
Field Sparrow	exp		
Vesper Sparrow	doc		

Common Name	I&M status	2002	2003
Lark Sparrow	doc	X	X
Lark Bunting	exp	X	X
Grasshopper Sparrow	exp		
Fox Sparrow	exp		
Song Sparrow	doc	X	X
Lincoln's Sparrow	exp		
Harris's Sparrow	exp		
White-crowned Sparrow	doc		
Dark-eyed Junco	doc		
McCown's Longspur	exp		
Black-headed Grosbeak	exp	X	X
Blue Grosbeak	exp	X	X
Lazuli Bunting	exp	X	
Dickcissel	exp		
Bobolink	exp		
Red-winged Blackbird	doc	X	X
Western Meadowlark	doc	X	X
Yellow-headed Blackbird	doc		
Brewer's Blackbird	doc		
Common Grackle	doc	X	X
Brown-headed Cowbird	doc	X	X
Orchard Oriole	exp	X	X
Bullock's Oriole	doc	X	X
House Finch	doc		
Red Crossbill	exp	X	
American Goldfinch	doc	X	X
House Sparrow	doc		X

Appendix B. I&M status of bird species and results of RMBO inventories at Devil's Tower National Monument.

Common Name	I&M status	2002	2003
Canada Goose	doc		X
Wood Duck	doc		
Mallard	doc		X
Blue-winged Teal	exp		
Sharp-tailed Grouse	exp		
Wild Turkey	doc		X
Great Blue Heron	doc		
Turkey Vulture	doc	X	X
Osprey	doc		
Sharp-shinned Hawk	exp		
Cooper's Hawk	doc		
Northern Goshawk	doc		X
Red-tailed Hawk	doc		X
Golden Eagle	exp		
American Kestrel	doc		X
Prairie Falcon	doc		

Common Name	I&M status	2002	2003
Killdeer	doc		X
Spotted Sandpiper	exp		
Rock Pigeon	doc	X	X
Mourning Dove	doc	X	X
Black-billed Cuckoo	exp		
Eastern Screech-Owl	doc		
Great Horned Owl	doc		
Long-eared Owl	exp		
Northern Saw-whet Owl	exp	X	
Common Nighthawk	doc	X	
Common Poorwill	doc		X
White-throated Swift	doc	X	X
Belted Kingfisher	doc		
Lewis's Woodpecker	exp		
Red-headed Woodpecker	doc	X	X
Downy Woodpecker	doc		X
Hairy Woodpecker	doc	X	X
Black-backed Woodpecker	doc		
Northern Flicker	doc	X	X
Western Wood-Pewee	doc	X	X
Dusky Flycatcher	exp		
Say's Phoebe	doc		
Western Kingbird	doc	X	X
Eastern Kingbird	doc		X
Loggerhead Shrike	exp		
Plumbeous Vireo	doc	X	X
Warbling Vireo	doc	X	X
Red-eyed Vireo	doc	X	
Gray Jay	doc		
Blue Jay	doc	X	X
Pinyon Jay	doc		
Clark's Nutcracker	exp		
Black-billed Magpie	doc		
American Crow	doc	X	X
Horned Lark	exp		
Tree Swallow	doc		
Violet-green Swallow	doc		X
Northern Rough-winged Swallow	doc		
Cliff Swallow	doc	X	X
Barn Swallow	doc		X
Black-capped Chickadee	doc	X	X
Red-breasted Nuthatch	doc	X	X
White-breasted Nuthatch	doc		X
Brown Creeper	doc	X	X
Rock Wren	doc	X	X
Canyon Wren	doc		

Common Name	I&M status	2002	2003
House Wren	doc	X	X
Eastern Bluebird	exp		
Mountain Bluebird	doc		X
Townsend's Solitaire	doc	X	X
Swainson's Thrush	exp		
American Robin	doc	X	X
Gray Catbird			X
Brown Thrasher	doc		
European Starling	doc	X	X
Cedar Waxwing	doc	X	X
Yellow Warbler	doc	X	X
Yellow-rumped Warbler	doc	X	X
Blackpoll Warbler	doc		
American Redstart	exp		
Ovenbird	doc		X
MacGillivray's Warbler	exp		
Common Yellowthroat	exp		
Yellow-breasted Chat	exp		
Western Tanager	doc		X
Spotted Towhee	doc	X	X
Chipping Sparrow	doc	X	X
Clay-colored Sparrow	doc		
Vesper Sparrow	doc		
Lark Sparrow	doc	X	X
Grasshopper Sparrow	exp		
Dark-eyed Junco	doc	X	X
Rose-breasted Grosbeak	doc		
Black-headed Grosbeak	doc	X	X
Lazuli Bunting	doc		
Indigo Bunting	doc		
Red-winged Blackbird	doc	X	X
Western Meadowlark	doc	X	X
Brewer's Blackbird	doc		
Common Grackle	doc	X	X
Brown-headed Cowbird	doc	X	X
Bullock's Oriole	doc	X	X
Cassin's Finch	exp		
House Finch	exp		
Red Crossbill	doc		X
Pine Siskin	doc	X	X
American Goldfinch	doc	X	X
House Sparrow	doc		

Appendix C. I&M status of bird species and results of RMBO inventories at Fort Union Trading Post National Historic Site.

Common Name	I&M status	2002	2003
Canada Goose	doc	X	X
Wood Duck		X	X
Gadwall	doc	X	X
American Wigeon	doc		
Mallard	doc	X	X
Blue-winged Teal	doc	X	X
Northern Shoveler	doc	X	
Northern Pintail	exp		
Green-winged Teal	doc		
Canvasback	doc		
Redhead	doc		
Lesser Scaup	doc		
Common Goldeneye	doc		
Ruddy Duck	doc		
Gray Partridge	doc		
Ring-necked Pheasant	doc	X	X
Greater Sage-Grouse	doc		
Sharp-tailed Grouse	exp		
Wild Turkey	exp	X	X
Pied-billed Grebe	doc		
Eared Grebe	doc		
Western Grebe	doc	X	
American White Pelican	doc	X	X
Double-crested Cormorant	doc	X	X
American Bittern	doc		
Great Blue Heron	doc		X
Black-crowned Night-Heron	exp		
Turkey Vulture	doc	X	X
Bald Eagle	doc		
Northern Harrier	doc	X	X
Sharp-shinned Hawk	exp		
Cooper's Hawk	exp		
Swainson's Hawk	exp		
Red-tailed Hawk	doc	X	X
Ferruginous Hawk	doc		
Golden Eagle	doc		
American Kestrel	doc	X	X
Merlin	doc		
Prairie Falcon	doc	X	
Sora	doc	X	
American Coot	doc		
Killdeer	doc	X	X
American Avocet	doc		
Solitary Sandpiper	doc		

Common Name	I&M status	2002	2003
Willet	doc		
Spotted Sandpiper	doc	X	X
Upland Sandpiper	doc		
Long-billed Curlew	doc		
Marbled Godwit	exp		X
Wilson's Snipe	exp		
Wilson's Phalarope	exp		X
Franklin's Gull	exp	X	
Ring-billed Gull	doc	X	
California Gull	doc	X	
Caspian Tern			X
Common Tern	exp		
Forster's Tern	exp	X	
Least Tern	exp		X
Black Tern	exp		
Rock Pigeon	doc	X	
Mourning Dove	doc	X	X
Black-billed Cuckoo	exp		
Eastern Screech-Owl	exp		X
Great Horned Owl	doc	X	
Burrowing Owl	doc		
Short-eared Owl	exp		
Boreal Owl	doc		
Common Nighthawk	doc	X	
Common Poorwill	exp		
Belted Kingfisher	exp		X
Red-headed Woodpecker	doc		X
Downy Woodpecker	doc	X	X
Hairy Woodpecker	doc		X
Northern Flicker	doc	X	X
Western Wood-Pewee	doc		
Willow Flycatcher	exp		
Least Flycatcher	doc	X	X
Eastern Phoebe	doc		
Say's Phoebe	exp		
Western Kingbird	doc	X	X
Eastern Kingbird	doc	X	X
Loggerhead Shrike	doc		
Warbling Vireo	doc	X	X
Red-eyed Vireo	doc	X	X
Blue Jay	exp		
Black-billed Magpie	doc	X	X
American Crow	doc	X	X
Common Raven	doc		
Horned Lark	doc		
Purple Martin	exp		

Common Name	I&M status	2002	2003
Tree Swallow	exp		X
Northern Rough-winged Swallow	doc	X	
Bank Swallow	doc		X
Cliff Swallow	doc	X	X
Barn Swallow	doc	X	X
Black-capped Chickadee	doc	X	X
White-breasted Nuthatch	exp		X
Rock Wren	doc		
House Wren	doc	X	X
Marsh Wren	exp		
Eastern Bluebird	exp		
Mountain Bluebird	doc		
Veery	exp	X	X
American Robin	doc	X	X
Gray Catbird	doc	X	X
Brown Thrasher	exp		X
European Starling	doc	X	X
Sprague's Pipit	doc		
Bohemian Waxwing	doc		
Cedar Waxwing	doc		X
Yellow Warbler	doc	X	X
Black-and-white Warbler		X	X
American Redstart	doc	X	X
Ovenbird	exp	X	X
Common Yellowthroat	doc	X	X
Yellow-breasted Chat	doc	X	X
Spotted Towhee	doc	X	X
Chipping Sparrow	doc	X	X
Clay-colored Sparrow	doc	X	X
Brewer's Sparrow	doc		
Field Sparrow	exp		
Vesper Sparrow	doc	X	X
Lark Sparrow	doc	X	X
Lark Bunting	doc		
Savannah Sparrow	doc		
Grasshopper Sparrow	doc		
Baird's Sparrow	exp		
Song Sparrow	doc	X	X
McCown's Longspur	exp		
Chestnut-collared Longspur	exp		
Rose-breasted Grosbeak	exp		
Black-headed Grosbeak	exp	X	X
Lazuli Bunting	doc	X	X
Indigo Bunting	exp		
Dickcissel	exp		
Bobolink	doc	X	X

Common Name	I&M status	2002	2003
Red-winged Blackbird	doc	X	X
Western Meadowlark	doc	X	X
Yellow-headed Blackbird	doc	X	X
Brewer's Blackbird	doc	X	X
Common Grackle	doc	X	X
Brown-headed Cowbird	doc	X	X
Orchard Oriole	exp		
Bullock's Oriole	exp	X	
Baltimore Oriole	doc		X
American Goldfinch	doc	X	X
House Sparrow	doc		

Appendix D. I&M status of bird species and results of RMBO inventories at Jewel Cave National Monument.

Common Name	I&M status	2002	2003
Mallard			X
Ruffed Grouse	exp		
Wild Turkey	exp		
Turkey Vulture	doc	X	X
Bald Eagle	exp		
Sharp-shinned Hawk	exp		X
Cooper's Hawk	exp		
Northern Goshawk	exp	X	
Red-tailed Hawk	doc		X
American Kestrel	exp		X
Killdeer	doc		
Mourning Dove	doc	X	X
Great Horned Owl	doc		
Northern Saw-whet Owl	exp	X	X
Common Nighthawk	doc	X	X
Common Poorwill	doc	X	X
White-throated Swift	doc	X	X
Lewis's Woodpecker	doc		
Red-headed Woodpecker	exp		X
Downy Woodpecker	doc		X
Hairy Woodpecker	doc	X	X
Black-backed Woodpecker	exp	X	X
Northern Flicker	doc	X	X
Western Wood-Pewee	exp	X	X
Dusky Flycatcher	doc	X	X
Cordilleran Flycatcher	doc		X
Western Kingbird			X
Plumbeous Vireo	doc	X	X
Warbling Vireo	doc	X	X
Gray Jay	exp		

Common Name	I&M status	2002	2003
Clark's Nutcracker	doc		
American Crow	doc	X	X
Violet-green Swallow	doc	X	X
Cliff Swallow	exp		
Barn Swallow	exp		
Black-capped Chickadee	doc	X	X
Red-breasted Nuthatch	doc	X	X
White-breasted Nuthatch	doc	X	X
Pygmy Nuthatch	exp		
Brown Creeper	doc	X	X
Rock Wren			X
Canyon Wren	exp	X	
House Wren	doc	X	X
Ruby-crowned Kinglet	doc		
Eastern Bluebird	exp	X	X
Mountain Bluebird	doc	X	X
Townsend's Solitaire	doc	X	X
Swainson's Thrush	doc	X	
American Robin	doc	X	X
European Starling	exp		
Cedar Waxwing			X
Yellow-rumped Warbler	doc	X	X
American Redstart	doc		
Ovenbird	doc	X	X
MacGillivray's Warbler	doc	X	X
Common Yellowthroat	exp		
Western Tanager	doc	X	X
Spotted Towhee			X
Chipping Sparrow	doc	X	X
Field Sparrow		X	
Vesper Sparrow		X	X
Lark Sparrow		X	
Dark-eyed Junco	doc	X	X
Indigo Bunting		X	
Red-winged Blackbird	doc		X
Brewer's Blackbird		X	
Brown-headed Cowbird	doc	X	X
Cassin's Finch	doc		
House Finch	exp		
Red Crossbill	doc	X	
Pine Siskin	doc	X	X
American Goldfinch		X	X

Appendix E. I&M status of bird species and results of RMBO inventories at Knife River Indian Villages National Historic Site.

Common Name	I&M status	2002	2003
Canada Goose	doc	X	X
Wood Duck	doc		X
Gadwall	doc		
American Wigeon	doc		
Mallard	doc	X	X
Blue-winged Teal	doc		
Common Goldeneye	doc		
Common Merganser	doc		
Gray Partridge	doc		
Ring-necked Pheasant	doc	X	X
Sharp-tailed Grouse	doc		
Wild Turkey	doc	X	X
American White Pelican	doc	X	X
Double-crested Cormorant	doc		X
Great Blue Heron	doc	X	X
Turkey Vulture	doc	X	X
Osprey	doc		
Bald Eagle	doc	X	X
Northern Harrier	doc	X	X
Sharp-shinned Hawk	doc		
Cooper's Hawk	doc	X	X
Northern Goshawk	doc		
Broad-winged Hawk		X	
Swainson's Hawk	doc		
Red-tailed Hawk	doc	X	X
Ferruginous Hawk	exp		
Golden Eagle	doc		
American Kestrel	doc	X	X
Merlin	doc		
Prairie Falcon	doc		
Piping Plover	exp		
Killdeer	doc	X	X
Willet		X	
Spotted Sandpiper	doc		X
Upland Sandpiper	doc	X	X
Marbled Godwit		X	
Ring-billed Gull	doc		X
California Gull	doc	X	X
Herring Gull	doc		
Forster's Tern		X	
Least Tern	doc		
Rock Pigeon	doc		X
Mourning Dove	doc	X	X
Black-billed Cuckoo	doc	X	

Common Name	I&M status	2002	2003
Eastern Screech-Owl	doc	X	X
Great Horned Owl	doc	X	X
Snowy Owl	doc		
Burrowing Owl	exp		
Long-eared Owl	doc		
Short-eared Owl	doc		
Common Nighthawk	doc	X	X
Chimney Swift	exp	X	
Belted Kingfisher	exp		
Red-headed Woodpecker	doc		X
Downy Woodpecker	doc		X
Hairy Woodpecker	doc	X	X
Northern Flicker	doc	X	X
Olive-sided Flycatcher	doc		
Eastern Wood-Pewee	exp		
Alder Flycatcher			X
Willow Flycatcher	doc		
Least Flycatcher	doc	X	X
Say's Phoebe	doc		X
Great Crested Flycatcher	doc	X	X
Western Kingbird	doc	X	X
Eastern Kingbird	doc	X	X
Loggerhead Shrike	exp		
Northern Shrike	doc		
Bell's Vireo	exp		
Warbling Vireo	doc	X	X
Red-eyed Vireo	doc	X	X
Blue Jay	doc	X	X
Black-billed Magpie	doc	X	X
American Crow	doc	X	X
Horned Lark	doc		X
Purple Martin	doc		
Tree Swallow	doc	X	X
Northern Rough-winged Swallow	doc	X	X
Bank Swallow	doc		X
Cliff Swallow	doc	X	X
Barn Swallow	doc		X
Black-capped Chickadee	doc	X	X
Red-breasted Nuthatch	doc		
White-breasted Nuthatch	doc	X	X
Brown Creeper	doc		
House Wren	doc	X	X
Eastern Bluebird	doc		X
Veery	exp		
Swainson's Thrush			X
American Robin	doc	X	X

Common Name	I&M status	2002	2003
Gray Catbird	doc	X	X
Brown Thrasher	doc	X	X
European Starling	doc	X	X
Sprague's Pipit	exp		
Bohemian Waxwing	doc		
Cedar Waxwing	doc	X	X
Orange-crowned Warbler	doc		
Yellow Warbler	doc	X	X
Yellow-rumped Warbler	doc		
Palm Warbler	doc		
Black-and-white Warbler	doc	X	X
American Redstart	doc	X	X
Ovenbird	doc	X	X
Common Yellowthroat	doc	X	X
Yellow-breasted Chat	doc	X	X
Scarlet Tanager	exp		
Spotted Towhee	doc	X	X
Chipping Sparrow	doc		X
Clay-colored Sparrow	doc	X	X
Field Sparrow	doc	X	X
Vesper Sparrow	doc	X	X
Lark Sparrow	doc	X	X
Lark Bunting	doc		
Savannah Sparrow	exp	X	X
Grasshopper Sparrow	doc	X	X
Baird's Sparrow	exp		
Song Sparrow	doc	X	X
McCown's Longspur	exp		
Chestnut-collared Longspur	exp		
Rose-breasted Grosbeak	exp		
Black-headed Grosbeak	doc	X	X
Lazuli Bunting	doc	X	X
Indigo Bunting	exp		
Dickcissel	exp		
Bobolink	doc	X	X
Red-winged Blackbird	doc	X	X
Western Meadowlark	doc	X	X
Brewer's Blackbird	doc	X	
Common Grackle		X	X
Brown-headed Cowbird	doc	X	X
Orchard Oriole	doc	X	
Baltimore Oriole	doc	X	X
Red Crossbill	exp		
Pine Siskin	exp		
American Goldfinch	doc	X	X
House Sparrow	doc		

Appendix F. I&M status of bird species and results of RMBO inventories at Mount Rushmore National Memorial.

Common Name	I&M status	2002	2003
Ruffed Grouse	exp		
Wild Turkey	doc	X	
Turkey Vulture	doc	X	X
Sharp-shinned Hawk	exp	X	
Cooper's Hawk	exp		
Northern Goshawk	exp		
Red-tailed Hawk	exp		
Killdeer	exp		
Rock Pigeon	exp	X	
Mourning Dove	exp		
Great Horned Owl	doc		
Long-eared Owl	exp		
Northern Saw-whet Owl	exp	X	
Common Nighthawk	exp	X	X
Common Poorwill	exp		
White-throated Swift	doc	X	X
Downy Woodpecker	doc		
Hairy Woodpecker	doc	X	X
Black-backed Woodpecker	exp		
Northern Flicker	doc	X	X
Western Wood-Pewee	doc		
Dusky Flycatcher	exp	X	X
Cordilleran Flycatcher	doc	X	X
Plumbeous Vireo	doc		X
Warbling Vireo	doc	X	X
Gray Jay	doc		
Blue Jay			X
Clark's Nutcracker	exp		
American Crow	doc	X	
Violet-green Swallow	doc	X	X
Barn Swallow	doc		
Black-capped Chickadee	doc	X	X
Red-breasted Nuthatch	doc	X	X
White-breasted Nuthatch	doc	X	X
Brown Creeper	doc	X	X
Rock Wren		X	X
Canyon Wren	doc	X	X
House Wren	exp		
Ruby-crowned Kinglet	doc	X	X
Eastern Bluebird	exp		
Mountain Bluebird	exp		
Townsend's Solitaire	doc	X	X

Common Name	I&M status	2002	2003
Swainson's Thrush	doc	X	X
American Robin	doc	X	X
European Starling	exp		
Yellow-rumped Warbler	doc	X	X
Ovenbird	doc	X	X
MacGillivray's Warbler			X
Common Yellowthroat		X	X
Western Tanager	doc	X	X
Chipping Sparrow	doc	X	X
Song Sparrow			X
Dark-eyed Junco	doc	X	X
Black-headed Grosbeak		X	
Red-winged Blackbird	exp		
Brown-headed Cowbird	doc	X	X
Cassin's Finch	exp		X
Red Crossbill	doc	X	X
Pine Siskin	doc	X	X